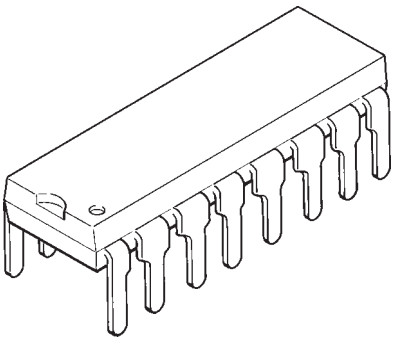
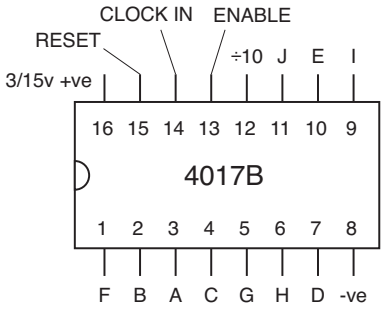
DECADE COUNTER (CMOS 4017)

WHAT IT LOOKS LIKE





PINS LETTERED A-J ARE THE 10 OUTPUT PINS

WHAT IT'S USED FOR

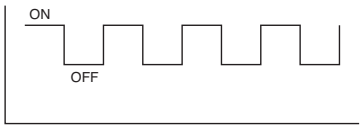
Decade counters have many uses in digital electronic circuits; they are used, for example, for dividing pulse counts, multiplexing and in a wide variety of situations involving counting and display.

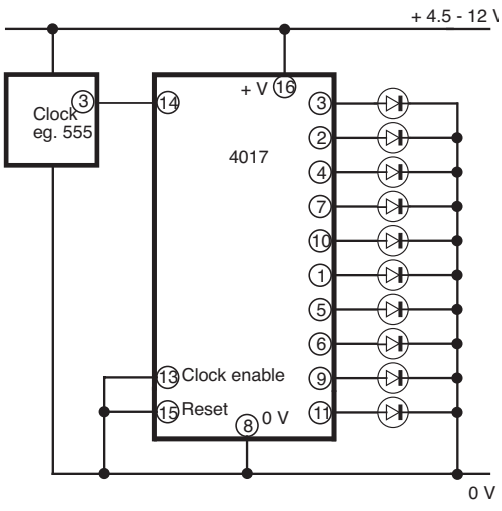
WHAT IT'S MADE OF

An integrated circuit (IC) consisting of a silicon chip in a plastic 16 pin package. The IC has 10 outputs, a clock input and enable and reset pins. The enable and reset facilities are controlled by taking to either logic 1 or logic 0.

HOW IT WORKS

When a clock signal (square wave pulse train) is provided at pin 14 (clock input), each of the other 10 output pins goes to logic 1 in turn. At any time only ***one*** output pin can be at logic 1; all the others remain at logic 0. If LEDs were connected to each output, each to light up in turn. If these were placed in a straight row in the correct sequence the effect would be for a ripple of light to run through the row. The illustration shows a 555 timer used in its astable mode as a clock.





In normal use, pin 13 (enable) and pin 15 (reset) are connected to the 0v rail (logic 0). If pin 13 is taken to logic 1 by connecting to the +v rail, the IC will stop its count at that instant. If pin 15 is taken to logic 1, the IC will reset to start at the beginning of its sequence.

HOW YOU USE IT

The CMOS 4017 must be connected to an external clock such as a 555 timer in astable mode. The output pins are not arranged around the IC in a linear sequence and so if, for example, an optical ripple effect is wanted, the outputs must be re-organised either by designing appropriate tracking on a PCB or by flying leads to an arrangement of LEDs.

An example application is given below. The 4017 forms part of a stepper motor controller programmed by a 'hard wired' diode matrix. The controller outputs are energised in a stepping sequence when diode links between the 4017 outputs and the output rails are in place as shown.